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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,959	08/10/2006	Satoshi Eguchi	1374.46346X00	4026
20457 7590 03/03/2009 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				
EXAMINER SLUTSKER, JULIA				
ART UNIT 2891		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/588,959

**Applicant(s)**

EGUCHI ET AL.

**Examiner**

JULIA SLUTSKER

**Art Unit**

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 November 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.  
4a) Of the above claim(s) 6 and 13-16 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1, 3-5, 7-12 and 17-21 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 08/10/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite since it is not clear how to form SiGe:C epitaxial layer without supplying the gas comprising germanium.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-5, 7, and 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Sukegawa (US 2003/0162370).

Regarding claim 1, Sukegawa discloses a manufacturing method of a semiconductor device comprising the steps of: (a) preparing a first raw material gas which contains a silane-based compound gas containing carbon atoms with first concentration of 0.3.% or more in a first hydrogen gas (Fig.10, numeral 16); (b) producing a first diluted raw material gas containing the silane-based compound gas with the second concentration lower than the first concentration by diluting the first raw material gas with a second hydrogen gas (page 6, [0888]); (c) supplying after the step (b) a first portion of the first diluted raw material gas into the inside of a reaction

chamber in which a wafer to be processed is accommodated (page 6, [0888]) and (d) forming a SiGe:C epitaxial layer or SiGe-based epitaxial layer on the a first main surface of the wafer to be processed using the first portion of the supplied first diluted raw material gas (page 6, [0090]), wherein a remaining second portion of the first diluted raw material gas is not supplied on the reaction chamber (note: some portion of the mixed gas always remains in the gas supply pipe (12) when SiGe:C layer is growing; e.g. they adhere to the interior of the pipe ([0089]) ) and is discharged without flowing through the reaction chamber (Fig.10, numeral 29; [0048]); note: gases not supplied into reaction chamber (1) are exhausted through exhaust pipe (29)).

Regarding claim 3, Sukegawa discloses that the first hydrogen gas and the second hydrogen gas have the substantially same concentration composition (Fig.10, numeral 30).

Regarding claim 4, Sukegawa discloses that the purity of the second hydrogen gas is 99.999% or more (page 3, [0049]).

Regarding claim 5, Sukegawa discloses that the reaction chamber is an epitaxial layer forming reaction chamber of a single wafer epitaxial device (page 3, [0045], [0046]).

Regarding claim 7, Sukegawa discloses that epitaxial layer constitutes a portion of a base region of a HBT (page 2, [0034], [0037]).

Regarding claims 17-20, Sukegawa discloses that the first concentration is more than 5% (column 6, [0888]).

Regarding claim 21, Sukegawa discloses that remaining second portion is discharged from a vent line (Fig. 10, numeral 29).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sukegawa as applied to claim 1 above, and further in view of Takahashi (US 6, 306, 211).

Regarding claim 8, Sukegawa does not disclose that the epitaxial layer is a channel region of a strain SiGe-based MISFET.

Takahashi however discloses that SiGe:C epitaxial layer is a channel region of a strain SiGe-based MISFET (column 5, lines 24-40; column 16, lines 55-61).

It would have been therefore obvious to one of ordinary skill in the art at time the invention was made to modify Sukegawa with Takahashi to use SiGe:C epitaxial layer as a channel region of a strain SiGe-based MISFET for the purpose of obtaining MISFET operating at high speeds (Sukegawa, column 16, lines 62-67).

6. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sukegawa.

Regarding claims 9-12, Sukegawa does not disclose the degree of dilution of first diluted raw material gas is set to value which falls within a range of 6 to 15.

Sukegawa however discloses that the first raw material is diluted with hydrogen gas such that a higher flow rate is gained under the condition that silicon-germanium layer is doped with a predetermined concentration of carbon (page 6, [0888])

It would have been therefore obvious to one of ordinary skill in the art at time the invention was made to modify Sukegawa to dilute the first raw material to a value which is set within claimed range for the purpose of gaining the higher flow rate of carbon source gas and to efficiently inhibit boron diffusion (page 6, [0088]).

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1—5, 7-12 and 17-20 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIA SLUTSKER whose telephone number is (571)270-3849. The examiner can normally be reached on Monday-Friday, 8 a.m.-5 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571)-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JS

February 25, 2009

/Asok K. Sarkar/

Primary Examiner, Art Unit 2891

February 27, 2009